

Abstract

A phase shift mask which includes an etched quartz region that provides a 180 degree phase shift, and an attenuated film which provides a 0 (or 360) degree phase shift. The phase shift mask provides performance comparable to CPL, while at the same time, avoiding the problems and manufacturability issues associated with EDA. The phase shift mask has better contrast than CPL, and a process window that is comparable to both CPL and alternating phase shift masks. The phase shift mask that does not require a second critical write, as is the case with CPL, does not need a second mask to eliminate unwanted patterns resulting from phase edges, and does not need a complicated EDA solution (like CPL). Finally, the phase shift mask is simple to manufacture, requiring only a single write step if employed with the back-side exposure technique which is well known in the mask-making industry.